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is but the culmination of a long series of changes which have been taking place both within and without the nucleus. All of these changes are ascribed by Professor Hartog to the operation of other physical and vital forces which are finally succeeded by the "new force" which comes into operation upon the establishment of the spindle-shaped figure. The efforts of many who would explain the process of mitosis through the action of various chemical and physical laws have failed through inadequacy of the explanations to meet all the conditions of the process. It does not seem that the author has been more successful by first proclaiming an absolute divorce between nuclear division and cell division and then invoking a new force to complete the broken contract.

For those who enjoy philosophical debate and formal explanations there will be much of interest in Professor Hartog's discussion of vitalism and of heredity through the operation of universal and unconscious memory. Very readable is his appreciation of the work of Samuel Butler. The teacher will find sound argument for natural as opposed to strictly logical methods of teaching in the chapter on "Interpolation in Memory." In the final chapter on "The Teaching of Nature Study" there is much sound pedagogical wisdom and moral support for those who would have such work taught in a way to make it worth the while of the student.

C. E. McCLEUNG

Modern Research in Organic Chemistry. By F. G. POPE, B.Sc. (Lond.), F.C.S., Lecturer on Organic Chemistry, East London College, New York, D. Van Nostrand Company, 1913. $5\frac{1}{2} \times 7\frac{1}{2}$, Cloth. Pp. xi + 324. With 261 diagrams. Price \$2.25 net.

This book is an attempt to bring before the student of chemistry a brief account of the development of some of the more important chapters of organic chemistry. It is the American reprint of the English book with the same title published by Methuen and Co. in London in 1912. It contains an introduction by Professor J. T. Hewitt and nine chapters which

have no connection with each other. These chapters are: I., The Polymethylenes; II., The Terpenes and Camphors; III., The Uric Acid or Purine Group; IV., The Alkaloids; V., The Relation between the Color and Constitution of Chemical Compounds; VI., Salt Formation, Pseudo-acids and Bases; VII., The Pyrones; VIII., Ketenes, Ozonides, Triphenylmethyl; IX., The Grignard Reaction.

In each chapter methods of preparation, for the most part synthetical, are given and the reactions of some of the best known representatives of the different classes of compounds are discussed, especially those which are used to determine the structural formulas of the compounds. Throughout the book structural formulas are used almost exclusively. At the end of each chapter there is a bibliography containing a list of the more important papers on the subject matter of the text, so that the student may consult the original articles if he desires to do so. The book is very difficult reading, but for those to whom the original papers are not available and who wish a brief résumé of the researches on which the structure of these compounds is based, it will probably prove useful.

In a book with such a title we should naturally expect something to be said of the researches on the carbohydrates, on the synthesis of indigo and of india-rubber, but no mention is made of these very important chapters of organic chemistry.

W. R. ORNDORFF

SCIENTIFIC JOURNALS AND ARTICLES

THE October number (Vol. 14, No. 4) of the *Transactions of the American Mathematical Society* contains the following papers:

Maxime Bôcher: "Applications and generalizations of the conception of adjoint systems."

E. J. Wilczynski: "On a certain class of self-projective surfaces."

G. A. Miller: "On the representation groups of given abstract groups."

Dunham Jackson: "On the accuracy of trigonometric interpolation."

G. D. Birkhoff: "On a simple type of irregular singular point."

John McDonnell: "On quadratic residues."